

GROUNDWATER PROTECTION PROGRAM:

The Montana Agricultural Chemical Groundwater Protection Act (MACGWPA) was enacted in 1989. Program accomplishments include:

- Adoption of rules.
- Increased capacity of statewide groundwater monitoring system.
- Promotion of research of Montana's aquifers.
- Building cooperative working relationships with private and government groups.
- Completion of a General Management Plan for state driven pesticide-groundwater issues and a Generic Management Plan for federally mandated pesticide-groundwater management plans. Both of these documents are meant to serve as the foundation for Specific Agricultural Chemical Management Plan (SMP) and Pesticide Management Plans (PMP's).
- Major river system-associated groundwater monitoring projects.
- Relational database of monitoring results.

1a. The Activities and Efforts Taking Place to Promote Compliance Assistance and Education

The Groundwater Protection program has undertaken the following to promote compliance with the statutory goals of the program:

Information/Education

The groundwater program promotes research and technical assistance. The department is dedicated to providing information and assistance to prevent groundwater contamination by agricultural chemicals. Through education and outreach, the department provides information on groundwater and agricultural chemical characterization, Best Management Practices (BMP) and Specific Management Plans (SMP). These plans provide for the management of agricultural chemicals to prevent, minimize and mitigate their presence in groundwater. The department is involved in an ongoing process of identifying environmentally sensitive areas, soils, and aquifers. Information about agricultural chemicals in Montana groundwater is provided through analytical results from the MDA's statewide monitoring program. Public meetings and pesticide certification training are used as a venue to inform the public about the locations of vulnerable areas in Montana. Special project reports, detailing our monitoring of major river systems for pesticides and nitrate are available on our web site.

It is the public policy of the state, Section 80-15-103, MCA, to protect groundwater from impairment, allow for the proper use of pesticides and to provide education and training to pesticide applicators and the general public. As required under Section 80-15-106, MCA, the department is required to develop and conduct appropriate educational programs. Groundwater protection is a component of all pesticide applicator training, which assures that dealers and applicators have the necessary knowledge and safety tools to sell and use pesticides in accordance with label directions. The MDA provides

education and training for commercial, non-commercial and governmental applicators and the general public on groundwater protection, agricultural chemical use, and the use of alternative crop protection methods.

The MDA, in cooperation with MSU Extension Service, provides initial and recertification training and testing of farm applicators. One of the major topics covered during the pesticide recertification training courses is how to protect Montana's water resources from agriculture chemical contamination. A variety of training manuals are available to provide education on agricultural chemical handling, use, application, and disposal. The Montana General Agricultural Chemical Ground Water Management Plan is a comprehensive strategy for Montana to protect groundwater from agricultural chemicals. The Generic Management Plan discusses the philosophy; requirements, development and implementation of federally mandated management plans and outlines the process to be used in their development.

The "*Pesticide and Fertilizer Use Around the Home, Effects on Water Resources and Alternatives to Chemical Controls*" as well as many other pamphlets, have been developed in cooperation with MSU Extension Water Quality Program, to provide information to homeowners on good stewardship practices and to protect water resources from the impacts of chemical use.

Technical Assistance

The position of the MDA, as guided by the Montana constitution and statute, is that agriculture and groundwater in the state can be protected. The department dedicates most of its assistance efforts to prevention of groundwater contamination by agricultural chemicals through the use of MDA, EPA, and MSU Extension Service bulletins, brochures, reports, other training aids. Protection efforts also involve participating in educational programs, direct contact with the regulated community, and sharing of analytical data with other agencies working to protect Montana's water quality.

The Montana Agricultural Chemical Ground Water Protection Act (MACGWPA) provides for the Groundwater Protection Program, which is presently a research and technical assistance program. General statewide ambient groundwater monitoring for contamination by agricultural chemicals has been ongoing since 1984, before the law was passed. The MACGWPA required the development of the General Management Plan principally as a tool to identify environmentally sensitive areas, soils, and aquifers and to develop Best Management Practices for the use of agricultural chemicals in Montana.

Section 80-15-202, MCA, directs the MDA to conduct monitoring to determine if agricultural chemical residues are present in groundwater resources and to determine the likelihood of agricultural chemicals to enter groundwater. The department initiated a groundwater monitoring program in 1984. The department established a permanent monitoring well network in 1991. The network of permanent monitoring wells that is available for testing has grown from the eight wells in 1984, to its present size of 37. Currently, MDA collects samples for chemical analysis from 48 wells. The monitoring

wells are located in areas that are representative of Montana agricultural production, as well as areas with extensive noxious weed management. The department also conducts project specific monitoring to augment permanent well monitoring efforts, generally as a response to new scientific research or to meet a state identified need.

Monitoring results indicating the presence of an agricultural chemical are evaluated to determine if a response is necessary or appropriate. An appropriate response may include well owner notification, use recommendations, mandatory spill clean-up, additional monitoring, or referral to the Department of Environmental Quality for remediation. The development of a Specific Management Plan (SMP) pursuant to Section 80-15-212, MCA may also be an appropriate response. Continued monitoring, data sharing and education are also incorporated in a response, which will promote awareness and resource protection.

Specific Management Plans (SMP)

Section 80-15-212, MCA, requires the MDA to adopt "Specific Agricultural Chemical Groundwater Management Plans" when necessary to protect groundwater. The 2005 Legislature passed HB 107, which clarified conditions requiring a Specific Management Plan (SMP). This gave the department more flexibility in addressing the presence of low level agriculture chemicals in groundwater through educational measures to prevent, minimize and mitigate pesticide presence in groundwater that would be more appropriate and cost effective than development of a Specific Management Plan under administrative rule. Under provisions of HB 107, a SMP is required when an agricultural chemical is found at or above 50 percent of the concentration level believed to cause a human health risk.

To date, the department has adopted one SMP, which was developed under provisions prior to passage of HB 107. That SMP was for the wild oat herbicide Assert, which contains the active ingredient, imazamethabenz-methyl. The plan covered all persons in the Fairfield Bench area who use this product. The SMP used a voluntary approach because of the low levels of chemical (<10 parts per billion) that were present in groundwater under the bench, and the significantly higher Human Health Standard for groundwater of 1,700 ppb. The plan outlined voluntary requirements for irrigation management, chemical rotation, calibration, integrated pest management and record keeping. An evaluation of the plan's success in 2005, including a statistical analysis of four years of monitoring data, showed the plan was working and that levels of imazamethabenz-methyl did not increase over that time. A survey of users showed that Best Management Practices (BMP) had been implemented by a majority of producers. The Voluntary Advisory Committee for the Fairfield Bench SMP found that the voluntary approach was successful and in August 2006, based on the committee's recommendation, Section 4.11.1201 through 4.11.1209, ARM, (which included the details of the SMP) was repealed.

1b. Size and Description of the Regulated Community

In general, the regulated community includes all persons who apply pesticides to control weed, insect, animal and microorganism pests. Anyone who applies pesticides must read and follow the container label directions for use, including the label directions to protect both ground and surface water.

There are parts of the regulated community that are easily identifiable through the licensing process; however, there are parts of the regulated community that do not require licensing and are not easily identified or necessarily trained. That part of the community includes landowners, including homeowners, who use pesticides. Pesticide dealers, fertilizer dealers, and some pesticide applicators are required to be licensed by the MDA and would be identifiable for training and possible regulation. The same is true for landowners who desire training on groundwater pollution prevention techniques or Best Management Practices (BMPs) and Best Available Technology (BATs).

1c. Non Compliance and Method of Discovery:

The MDA has issued administrative orders requiring cleanup of pesticide spills, sampling soils and groundwater, and some soil removals. Orders are issued using authority of the Montana Pesticide Act, Title 80. The department has issued informative letters to fertilizer facilities where soils may be contaminated with high levels of nitrate that have the potential of impacting groundwater. The letters provided information to improve operational activities to minimize further contamination. The information contained Best Management Practices for handling and storage containment of fertilizers.

Monitoring results are used to determine if a pesticide is present in groundwater resources. Additional sampling is conducted to verify all initial detections. Verified detections are further evaluated to determine the relative health and environmental risk that an agricultural chemical presence represents. The Department of Environmental Quality is responsible for development of interim numerical human health standards in the absence of federal standards. Surface water detections are measured against aquatic life benchmarks developed by EPA. The relative significance of an agricultural chemical residue in groundwater is related to the percentage of the Montana Water Quality Standard met. The MDA puts forth effort in locating contaminated groundwater bodies, possible source(s) for the contamination, and to what extent the body of water is impaired. Dependent upon the contamination level and source, (i.e., point or non-point source) the Department discusses and implements an appropriate enforcement and/or mitigation response.

Table 1 shows a summary of monitoring results from 2014-2017:

Table 1

Samples Collected & Analyzed per Year				
Year	Samples Collected	Total number of analyte measurements	Total Analyte Detections	Positive Detection Rate
2014*	157	16,698	382	2.3 %
2015	108	11,399	177	1.6 %
2016	112	11,609	217	1.9%
2017**	70	7,152	134	1.9%

*Sampling during 2014 included storm water samples and urban-runoff sediment samples that were discontinued.

**The 2017 season has three weeks of sampling still scheduled.

Inspections

The Act allows routine inspection of persons subject to the Specific Management Plans. The MDA has authority (Section 80-15-401, MCA) to sample, conduct inspections, collect samples for analysis, inspect monitoring equipment, and inspect and copy records required by the MACGWPA. MDA can investigate conditions relating to compliance with agricultural chemical labels, management plans, monitoring requirements, groundwater protection requirements and management plan violations or compliance orders. Because there are no current SMP's in place, no inspections have been conducted under this authority. The MDA Laboratory Bureau, located on the Montana State University campus, conducts laboratory analysis for the MDA, MSU Extension Service and the general public.

1d. Compliance and Enforcement History - Trends:

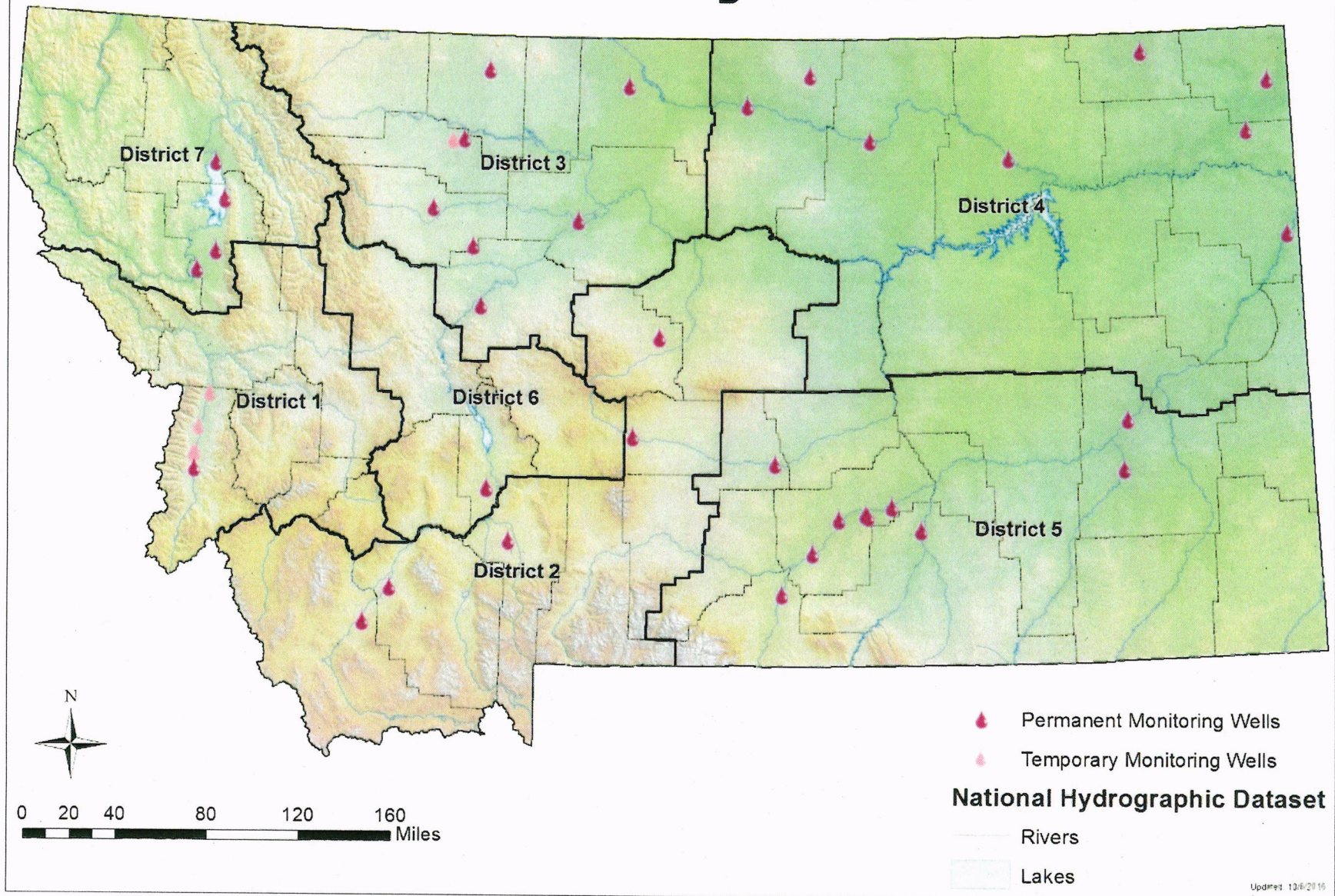
Compliance and Enforcement History - Trends:

At the time of this report, there are no significant non-compliance issues related to non-point source groundwater contamination from agricultural chemicals. When appropriate analysis of additional water resources, such as surface water from springs, creeks, rivers, lakes, ponds, and wetlands, are also conducted in relation to groundwater quality.

Where detected, pesticide concentrations are very low and do not exceed or approach human health drinking water standards. From 2008 to 2017 the average pesticide detection as a percentage of the respective Human Health Standing from Groundwater was <1% of the respective standard.

Nitrate data from the permanent monitoring wells, which are single use (monitoring wells) and not used for drinking or stock water, show that in most cases nitrate concentrations are below 50 percent of the drinking water standard. A few wells have elevated nitrate concentrations but the source of the nitrate has not been identified. The department coordinates nitrate results and follow-up activities with the DEQ.

Montana Department Of Agriculture Groundwater Protection Program 2016 Monitoring Locations

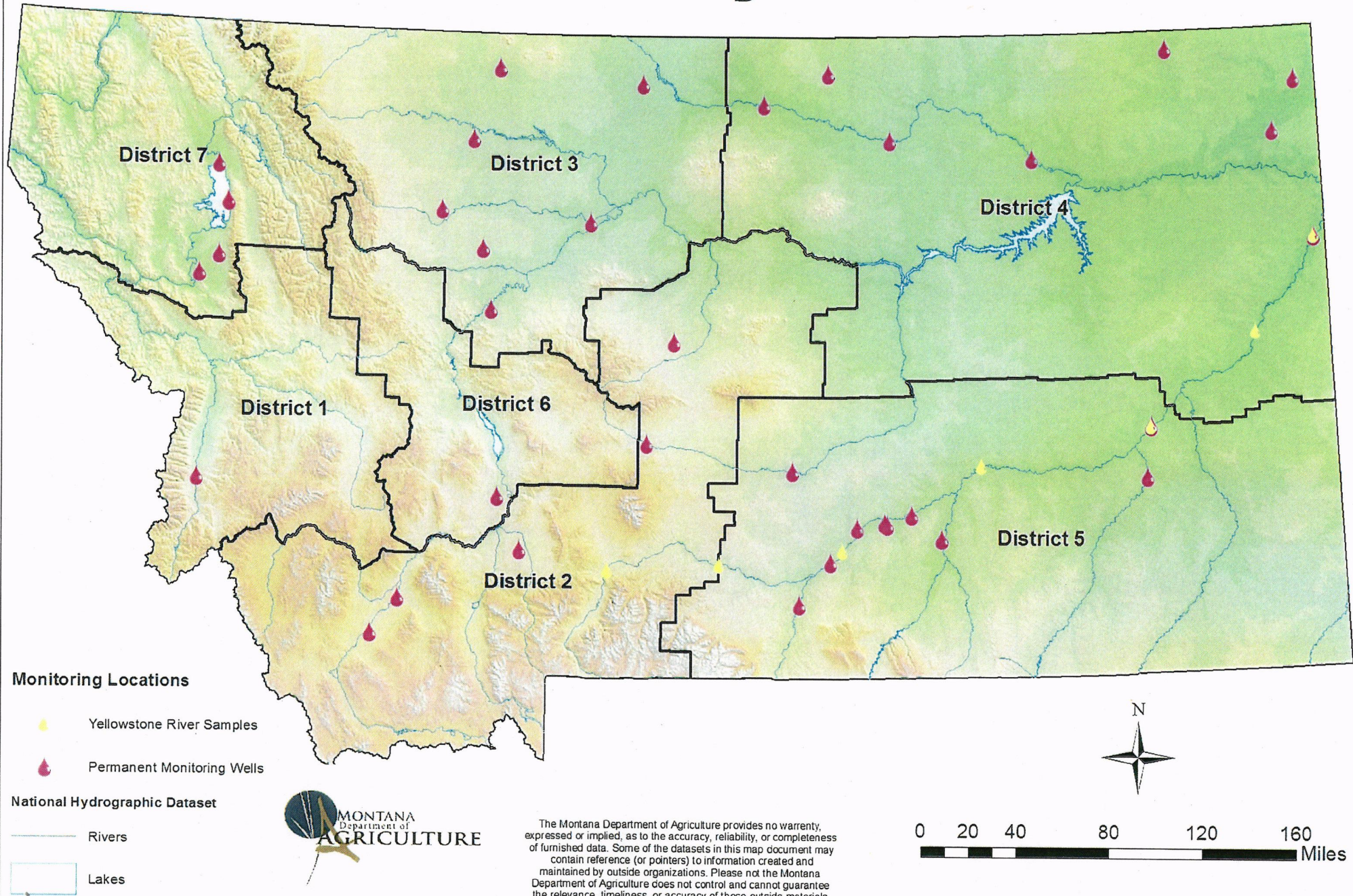


2016 Sampling Year Detection Summary

Analyte	Count	Mean (ppb)	Max (ppb)	Human Health Standard* (ppb)
2,4-D	13	0.010	0.014	10
Alachlor ESA	6	0.078	0.110	2
Alachlor OA	1	0.007	0.007	(sum parent + metabolites)
Aminopyralid	11	0.145	0.630	3,000
Atrazine	5	0.005	0.010	3
DEDIA	1	0.100	0.100	(sum parent + metabolites)
Deethyl atrazine	22	0.003	0.018	
Azoxystrobin	2	0.063	0.120	1,200
Bentazon	6	0.027	0.072	210
Bromoxynil	1	0.012	0.012	3.2
Chlorsulfuron	4	0.006	0.006	100
Clopyralid	1	0.340	0.340	1,000
Clothianidin	11	0.081	0.330	650
Difenoconazole	1	0.011	0.011	70
Dimethenamid OA	2	0.007	0.007	300
Flucarbazone	4	0.351	1.300	3,000
Fluroxypyr	1	1.300	1.300	7,000
Glyphosate	1	4.300	4.300	700
Hexazinone	4	0.002	0.002	300
Hydroxy atrazine	3	0.031	0.060	70
Imazamethabenz methyl acid metabolite	15	0.010	0.038	1,700
Imazamethabenz methyl ester	16	0.004	0.010	(sum parent + metabolites)
Imazamox	1	0.009	0.009	20,000
Imazapic	1	0.003	0.003	3,000
Imazapyr	5	0.006	0.013	17,000
Imazethapyr	4	0.005	0.005	17,000
Imidacloprid	9	0.003	0.008	380
MCPA	1	0.130	0.130	3
MCPP	2	0.008	0.011	300
Metalaxyl	3	0.004	0.004	400
Metolachlor ESA	19	0.139	0.820	40
Metolachlor OA	4	0.108	0.140	(sum parent + metabolites)
Metsulfuron methyl	4	0.010	0.011	1,700
NOA 407854	24	0.046	0.270	2,000
NOA 447204	4	0.042	0.080	(sum parent + metabolites)
Picloram	2	47.000	52.000	2,000
Prometon	47	0.012	0.110	100
Propiconazole	1	0.140	0.140	700
Prosulfuron	1	0.005	0.005	350
Pyrasulfotole	7	0.492	0.840	70
Pyroxsulam	1	0.013	0.013	7,000
Simazine	7	0.006	0.010	4
Sulfentrazone	2	0.043	0.045	700
Sulfosulfuron	2	0.011	0.012	1,600
Tebuthiuron	2	0.001	0.001	500
Thiamethoxam	3	0.030	0.049	80

*Human Health Standards for Groundwater from Circular DEQ-7

Montana Department Of Agriculture Groundwater Protection Program 2017 Monitoring Locations



2017 Sampling Year Detection Summary

Analyte	Count	Mean (ppb)	Max (ppb)	Human Health Standard* (ppb)
2,4-D	11	0.0149	0.0470	10
Alachlor ESA	4	0.0785	0.0990	2
Aminopyralid	4	1.3525	5.3000	3000
Atrazine	4	0.0022	0.0022	3
DEDIA	1	0.1000	0.1000	(sum parent + metabolites)
Deethyl atrazine	3	0.0019	0.0023	
Bentazon	9	0.0252	0.1100	210
Bromacil	4	0.0085	0.0210	700
Bromoxynil	5	0.0120	0.0120	3.2
Clopyralid	1	0.2200	0.2200	1000
Clothianidin	4	0.1425	0.2000	650
Dimethenamid OA	1	0.0077	0.0077	300
Diuron	3	0.0065	0.0089	10
Flucarbazone	5	0.0049	0.0140	3000
Fluroxypyr	4	0.0350	0.0350	7000
Glyphosate	1	1.0000	1.0000	700
Hexazinone	1	0.0015	0.0015	300
Hydroxy atrazine	3	0.0213	0.0240	70
Imazamethabenz methyl acid metabolite	7	0.0050	0.0110	1,700
Imazamethabenz methyl ester	5	0.0025	0.0041	(sum parent + metabolites)
Imazapyr	5	0.0045	0.0086	17000
Imazethapyr	2	0.0040	0.0040	17000
Imidacloprid	3	0.0025	0.0036	380
MCPA	6	0.0154	0.0220	3
MCPP	1	0.0044	0.0044	300
Metolachlor ESA	16	0.4185	3.3000	40
Metolachlor OA	2	0.2900	0.3000	(sum parent + metabolites)
Metsulfuron methyl	1	0.0100	0.0100	1700
NOA 407854	12	0.0211	0.1500	2,000
Picloram	2	0.3850	0.4900	2000
Prometon	9	0.0114	0.0820	100
Propiconazole	5	0.0210	0.0650	700
Pyrasulfotole	4	0.2058	0.7200	350
Simazine	3	0.0039	0.0051	4
Sulfentrazone	2	0.0350	0.0350	700
Sulfosulfuron	1	0.0054	0.0054	1600
Tebuthiuron	3	0.0011	0.0011	500
Thiamethoxam	2	0.0235	0.0250	80
Triclopyr	9	0.0438	0.0670	300

*Human Health Standards for Groundwater from Circular DEQ-7